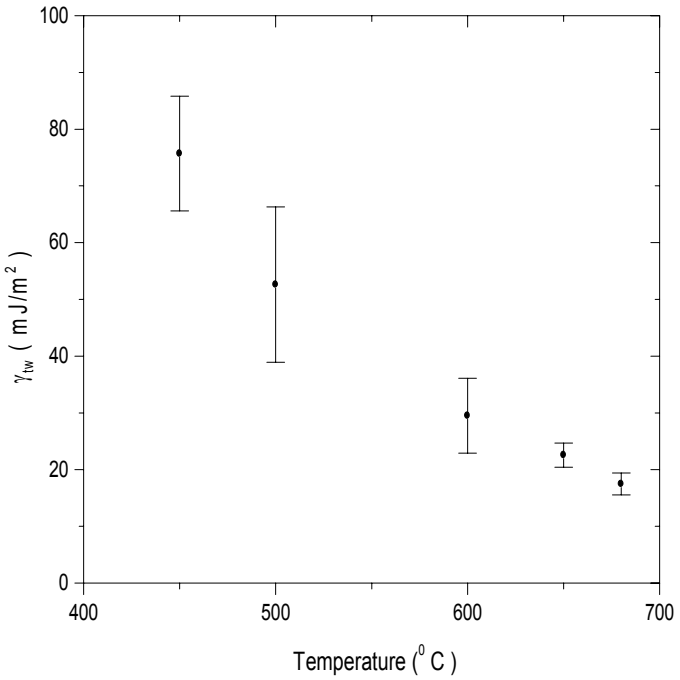
Twin Boundaries in Superconducting YBCO: Their energy & dependence on Processing Parameters

Siu-Wai Chan, Columbia University, DMR-0214650

Twin boundary energy has been measured by two methods:twin spacing and twin tip for the first time.



- Twin boundaries, being strong pinning centers, improve superconducting critical current density.
- To engineer high twin density we need to know the boundary energy and its dependence on temperature.
- As the temperature increases, the boundary energy decreases.
- The entropy and enthalpy are found to be 0.24 mJ/Km^2 and 246 mJ/m^2, respectively.

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Education:

Two undergraduates (*Mahnaz Milani-Baladi, Johnny Lin, & Sumesh Bhaskaran*), three graduate students (*O. Jongprateep and Josh Hao-Yung Chao and Joan M Raitano*) have contributed to this project.

Outreach: In conjunction with MRSEC, a program bringing Columbia Students and the excitement of materials to New York City schools to promote materials and technology is led by SWC. Roughly, 700 NYC students per year have seen our demo.